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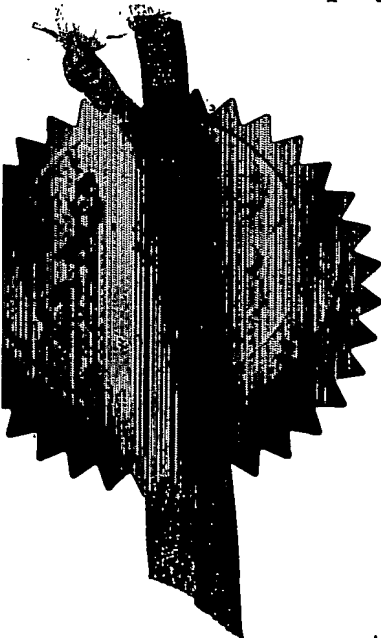
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# Patents Form 1

THE PATENT OFFICE

- 6 DEC 2002

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Patent Office 0228483.4

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Request for grant of a patent **NEWPORT**

1. Your Reference

RJP/JFB/X986

2. Application number

0228483.4

- 6 DEC 2002

3. Full name, address and postcode of the or each Applicant

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4. Title of the invention

BOTTLE

5. Name of agent

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15 CLARE ROAD

HALIFAX

HX1 2HY

Patents ADP number

190001

6. Priority claimed to:

Country

Application number

Date of filing

7. Divisional status claimed from:

Number of parent application

Date of filing

8. ~~Is a~~ statement of inventorship and ~~of right~~ to grant a patent required in support of this application?

YES

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description 11

Claim(s) 2 *DM*

Abstract 1

Drawing(s) 2 + 2

10. If you are also filing any of the following, state how many against each item

Priority documents

Translation of priority documents

Statement of inventorship and right to grant a patent (PF 7/77)

Request for a preliminary examination and search (PF 9/77) ☒

Request for substantive examination (PF 10/77)

Any other documents (please specify)

11.

We request the grant of a patent on the basis of this application.  
Signature Date

APPLEYARD LEES

05 Dec. 2002

*Appleyard Lees*

12. Contact

R J Pidgeon- 01422 330110

# Bottle

The present invention relates to a bottle for liquid medicine.

5

Typically, bottles for liquid medicine have an open neck, and the medicine is dispensed by pouring. The bottle is not adapted to be squeezed to impel the medicine from the bottle. Rather, it flows under gravity, into a measuring spoon or the like. When the measuring spoon is full to the required mark the bottle is placed upright again, and the cap put on sealingly to cover the neck.

This traditional approach has advantages of simplicity and economy, and it has been in use for many years. However it does have disadvantages. Dispensing liquid medicine by pouring is not always easily controlled and can induce spillages, especially when the medicine is of low viscosity. Secondly, when the bottle is placed upright after pouring, the medicine on the rim of the bottle space neck does not always flow back inside the neck. It may run down the outside of the neck and even run onto and down the body of the bottle, below the neck. The result is the formation of sticky residues on the outside the bottle. It may become very messy to handle and may make the place in which the consumer stores medicines sticky (eg the base of a medicine cabinet). The user may perceive that the sticky medicine residues are deleterious to hygiene, especially when near the neck of the bottle.

30

It is an object of the present invention to provide a medicine bottle which overcomes or eases at least one of the problems mentioned above.

In accordance with a first aspect of the present invention there is provided a bottle for liquid medicine, the bottle having a neck containing a self-sealing closure, the  
5 bottle being flexible such that, when it contains liquid medicine and is inverted or tilted downwardly, squeezing the bottle produces a flow of liquid medicine through the closure, and releasing the bottle terminates the flow of liquid medicine.

10

By "inverted or tilted downwardly" we mean that the bottle is oriented with the neck as the lowest part of the bottle.

15 Preferably the bottle has visually distinct upper and lower regions and a waist at the junction between them.

Preferably the upper region has rounded, downwardly sloping shoulders extending between the waist and the neck  
20 of the bottle.

Preferably each shoulder is substantially an arc of a circle. Preferably the arc is 40-80°, preferably 50-70°, of a circle whose centre is adjacent to the waist at the  
25 bottom of the opposite shoulder, but within the extent of the bottle.

Preferably the lower region of the bottle tapers from the base of the bottle to the waist.

30

Preferably the lower region is taller than the upper region.

More preferably the waist is located between 25% and 45%, most preferably between 35 and 42%, of the distance from the bottom of the neck of the bottle to the base of the bottle.

5

Preferably the height of the lower region is between 4 and 10 cm, preferably between 5 and 7 cm.

10 Preferably the height of the upper region is between 3 and 5 cm.

Preferably the height of the bottle, up to the base of the neck, is between 7 and 15 cm, preferably between 8 and 12 cm.

15

Preferably the volume of the bottle, up to the base of the neck, is between 50 and 250 ml, more preferably between 80 and 200 ml, most preferably between 100 and 160 ml.

20 Preferably the bottle has front and rear panels. Preferably each is movable toward the other. These may be connected directly to each other - preferably such that the bottle is generally oval in cross-section - or may be connected together by means of side walls. Most  
25 preferably the bottle is generally of box form, having larger front and rear panels connected to each other by two narrower side walls.

The front and rear panels are preferably each somewhat  
30 outwardly bowed so that they may be moved into a flatter form, one toward the other, to impel medicine from the bottle.

Preferably the bottle is designed such that the front and rear panels may be moved smoothly from their rest position to their fully inward position. By this we mean that the wall material of the bottle does not kink or crease abruptly as the panels are moved to their fully inward position.

Preferably the bottle is designed such that there is a limit to the inward movement of the front and rear panels in normal use, the limit position preferably being, under a moderate squeezing force adequate to provide the flow of liquid, the limit of flexure rather than the onset of kinking, creasing, or the like. Preferably the volume of the bottle in this limit position of the front and rear panels is at least 80% of the volume of the bottle.

It is preferably the front and rear panels which, in elevation, show the outline of any shaping of the bottle - for example when the upper region has shoulders and/or the lower region tapers. However, it is correspondingly the side walls which preferably have these features in relief.

Preferably the maximum width of the front and rear panels is at least twice the maximum width of the side walls (when provided).

When the bottle has side walls it is designed such that the bottle cannot be pressed by force applied across the side walls to any useful degree, ie without the wall material kinking or creasing.

Preferably the bottle is made of a plastics material of such a type, and formed with such a thickness, that it may

be elastically flexed in order to reduce the volume of the container, and impel liquid medicine inside it. A suitable material is a polyester, for example polyethylene terephthalate (PET). Preferably the bottle material is transparent, but is UV-resistant and/or coloured, preferably being brown. The bottle may be formed by a regular bottle-forming process in which a body of plastics material is heated and blown into a mould cavity.

10 The neck of the bottle preferably has press-fitted into it, in a sealing manner, a valve module, containing the self-sealing closure. The self-sealing closure preferably has a fitment piece, for securement in the neck, and a valve. The fitment piece preferably includes an annulus  
15 of supporting material, preferably a rigid plastics material, which has, depending orthogonally from it, a cylindrical piece which fits grippingly within the neck of the bottle, and, extending laterally outside that, a flange which rests against the rim of the neck. Within the  
20 annulus is the valve. The valve is preferably a slit valve of a plastics material, for example of an elastomeric or polyolefin material. Preferably, the plastics material is an elastomeric material, most preferably a silicone elastomeric material. Preferably  
25 the valve is urged open by raised pressure inside the bottle, and automatically seals over once again, when the pressure is released. Examples of such valves may be seen in US 5954237, US 5439143 and US 6446844.

30 The external surface of the neck may be formed with a screw thread, onto which a cap may be screwed. The cap is preferably of a child-proof type. Preferably the cap is of a tamper-evident type.



In a second aspect there is provided a bottle of the first aspect defined above, containing liquid medicine.

5 Thus a preferred embodiment of the invention is a bottle  
..... of liquid medicine which has a self-sealing closure in its  
neck; the bottle being flexible such that when it is  
inverted, squeezing the bottle produces a flow of liquid  
medicine through the closure, and releasing the bottle  
10 terminates the flow of liquid medicine; the bottle being  
shaped so as to assist this operation, in particular in  
having major front and rear panels, which can be  
controllably flexed..

15 In a third aspect there is provided a method of dispensing  
liquid medicine, using a bottle of the second aspect.

In use, a bottle containing liquid medicine has its cap  
removed and is turned so that the neck is lowermost. A  
20 measuring spoon or cup is held beneath the neck and the  
bottle gently squeezed, whereupon a smooth stream of  
liquid medicine is impelled into the spoon or cup. When  
the spoon or cup contains the required amount of medicine  
the user releases the squeezing force and the stream of  
25 medicine is immediately terminated, without dripping. The  
bottle is placed upright once again and the cap replaced.

It is observed that there is a negligible amount of  
medicine, or no medicine at all, left outside the bottle,  
30 and that dispensing is very precise.

The bottle has been designed to promote easy and accurate  
operation. The preferred features of the taper in the

lower region and the shoulders of the upper region, with the waist between them, are such that users are encouraged to hold the front and rear panels of the bottle. Notably they may grasp the lower region of the bottle, either with  
5 their finger wrapped around the lower region, with their  
forefinger around the waist, or with fingertips against one of the panels and thumb against the other of the panels. In either position the natural action is to gently press the front panel and/or the rear panel.

10

The invention will now be further described, by way of example, with reference to the accompanying drawings in which:

15 Fig. 1 is a frontal view of a bottle of the invention with its cap off;

Fig. 2 is a side view of the same bottle with its cap on;

20 Fig. 3 is a plan view of the same bottle with its cap off, from above; and

Fig. 4 is an under-plan view of the same bottle, from below.

25

As may be seen most clearly from Figs. 1 and 2 viewed together, the bottle may generally be described as being of box-form, having front and rear panels 2, 4, identical with each other, and two side panels indicated generally  
30 as 6, 8, identical with each other. The width of the side panels is considerably less than the width of the front and rear panels, by a ratio of approximately 1:3.

However, although the bottle may be viewed as having a box-like structure, as distinct from a traditional bottle shape of a cylinder surmounted by a frusto-conical top region, it is not of cuboid shape. Superimposed upon the  
5 generally box-like structure are important shape features, which will now be described.

The bottle has a lower region 10, and an upper region 12. The bottle's neck 14 projects upwards from the top of the  
10 upper region.

As can be seen in the frontal view of Fig. 1, the lower region tapers in the upward direction. In other words, the side panels 6, 8 are somewhat inwardly directed, in  
15 the lower region.

Also as shown best in Fig. 1, the upper region has two outwardly projecting formations, in the form of shoulders 15, 16. The shoulders are rounded and downwardly sloping,  
20 and extend between the neck of the bottle and the junction between the upper region and the lower region. It may be seen that at this junction the bottle has a waist 18. Each shoulder can be seen as representing an approximately 60° arc of a circle whose centre is near to the opposite  
25 shoulder, adjacent to the waist 18.

It will be apparent that the shoulders 15, 16 are formed as relief features in the side panels 6, 8, and this can best be seen in Fig. 2.

30

It will be seen in Fig. 2 that in the side walls the junction between each shoulder 15, 16 and the respective tapering region 6, 8 is of curved, upwardly-facing form.

The front and rear panels 2, 4 and the side panels 6, 8 terminate at the bottom of the bottle in a base wall 20, shown in Fig. 4. From this it may be seen that the front and rear panels 2, 4 are markedly convex. The side walls 6, 8 are very slightly convex. Due to their convex shape portions of the side walls may be seen in Fig. 2, and are indicated as 2A, 4A.

10 Fitted into the neck 14 of the bottle is a self-sealing closure 24, seen in Fig. 4. The closure consists of an annular plastics body 26 resting on the rim of the neck. It has a cylindrical part (not shown) resiliently retained within the neck. The plastics body supports in  
15 the opening within it a cross-slit silicone valve 28. The valve 28 is of the type which remains closed in all orientations until the liquid is in some manner impelled. When the impelling force is removed the closure seals once again.

20

The bottle wall is of a brown transparent flexible plastics (PET) material. Its volume may be reduced by squeezing, in order to impel liquid medicine through the closure 24. Because of the design of the bottle the side  
25 panels 6, 8 feel comparatively rigid whereas the front and rear panels 2, 4 feel much more flexible, in the upper region 12 and, especially, in the lower region 10. The bottle is designed such that the front and rear panels may be moved smoothly towards each other but with immediate  
30 relaxation when the force is removed. Applying a similar force to the side panels yields no such action. Rather, the force is initially resisted, then the side walls crumple.

The neck of the bottle is formed with a screw thread 30 and the cap 32 has a corresponding internal screw thread. It also has child-proof and tamper-evident features. 5 These features are all entirely standard and will not be described further.

The distance between the top of the upper region 12 (ie the base of the neck 14) to the waist 18 is approximately 10 four-tenths of the distance between the top of the upper region 12 to the base wall 20.

In this embodiment the width of the base wall is about 5.3 cm. The width of the waist is about 4.7 cm. The maximum 15 width of the upper region is about 5.0 cm. The distance between the top of the upper region and the waist is about 4.0 cm and the distance between the top of the upper region and the base wall is about 10.0 cm. The volume of the bottle (not including the neck space) is about 140 ml 20 and is intended to supply about 125 ml of liquid medicine.

To use the bottle the cap is removed, the bottle is inverted or downwardly tilted (as the user prefers), and the front and/or rear panel pressed in order to dispense 25 liquid medicine into a measuring device, for example a measuring cup or spoon. The bottle is designed so that the user is encouraged to press the front and/or rear panel 2, 4 in order to impel the liquid medicine through the closure 24. Moreover, it is designed so that it fits 30 comfortably within the hand, with the fingers of the user around the lower region, with the forefinger resting under one of the shoulders 14, 16, that is, around the waist 18; or with fingertips on one panel and thumb on the other.

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We have found that when the user grasps the bottle in either of these ways reliable dispensing can most readily be achieved. Accordingly the design of the bottle, with its box-type structure and with its tapering lower region, 5 the shoulders and the waist in between, is intended to maximise the likelihood of the user holding the bottle in one of these ways.

When the required amount of liquid medicine has been 10 dispensed the user releases the force on the bottle and the stream of liquid medicine is choked off immediately, by the coming together by the slits of the closure 24.

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## Claims

1. A bottle for liquid medicine, the bottle having a neck containing a self-sealing closure, the bottle being flexible such that, when it contains liquid medicine and is inverted or tilted downwardly, squeezing the bottle produces a flow of liquid medicine through the closure, and releasing the bottle terminates the flow of liquid medicine.
2. A bottle as claimed in claim 1, wherein the bottle has front and rear panels which may be urged towards one another to effect squeezing of the bottle.
3. A bottle as claimed in claim 2, wherein the front and rear panels are each outwardly bowed.
4. A bottle as claimed in claim 2 or 3, wherein the bottle is generally of box form, having larger front and rear panels connected to each other by two narrower side walls.
5. A bottle as claimed in claim 4, wherein the maximum width of the front and rear panels is at least twice the maximum width of the side walls.
6. A bottle as claimed in any preceding claim, having visually distinct upper and lower regions and a waist at the junction between them.

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7. A bottle as claimed in claim 6, wherein the upper region has rounded, downwardly sloping shoulders extending from the neck of the bottle to the waist.
- 5 8. A bottle as claimed in claim 6 or 7 wherein the  
..... lower region of the bottle tapers from the base of  
the bottle to the waist.
9. A bottle as claimed in any of claims 6 to 8 wherein  
10 the lower region is taller than the upper region.
10. A bottle as claimed in any preceding claim,  
containing liquid medicine.
- 15 11. A method of dispensing liquid medicine, using a  
bottle as claimed in claim 10.
12. A bottle for dispensing liquid medicine or its use  
in a method of dispensing liquid medicine, the  
20 bottle or method being substantially as  
hereinbefore described with reference to the  
accompanying drawings.

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**ABSTRACT****Bottle**

5 A bottle 2 of liquid medicine has a self-sealing closure  
in its neck 14, the bottle being flexible such that when  
it is inverted or tilted downwardly, squeezing the bottle  
produces a flow of liquid medicine through the closure,  
and releasing the bottle terminates the flow of liquid  
10 medicine. The bottle is shaped so as to assist the  
operation, being of generally box-form, having side walls  
6, 8 which support larger front and rear panels 10, which  
can be controllably flexed.

15

(Fig. 1)

1/2

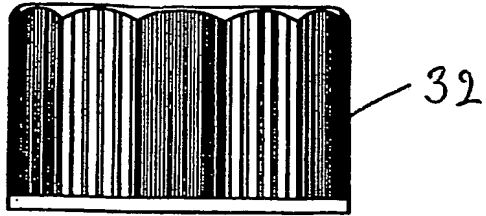
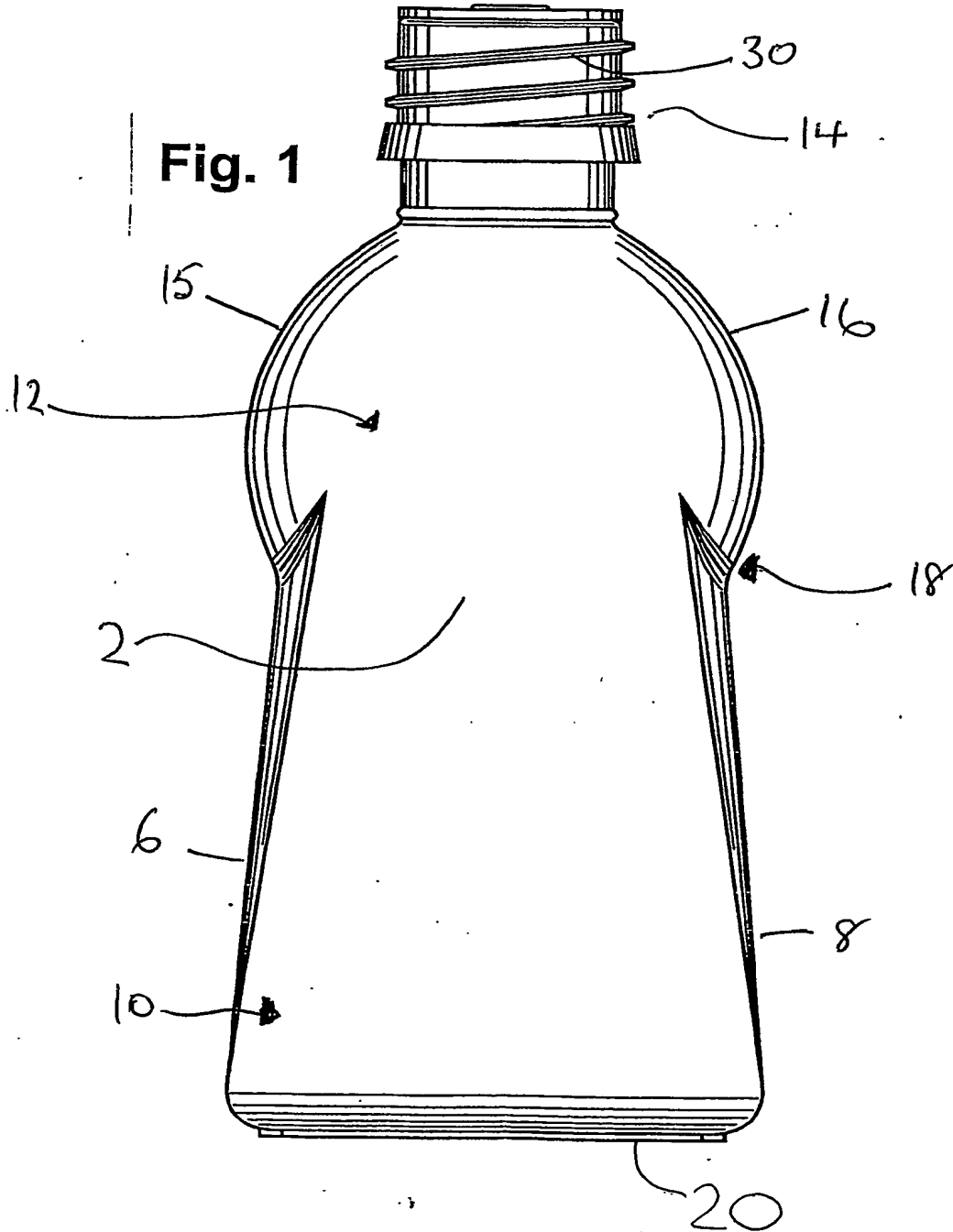


Fig. 1



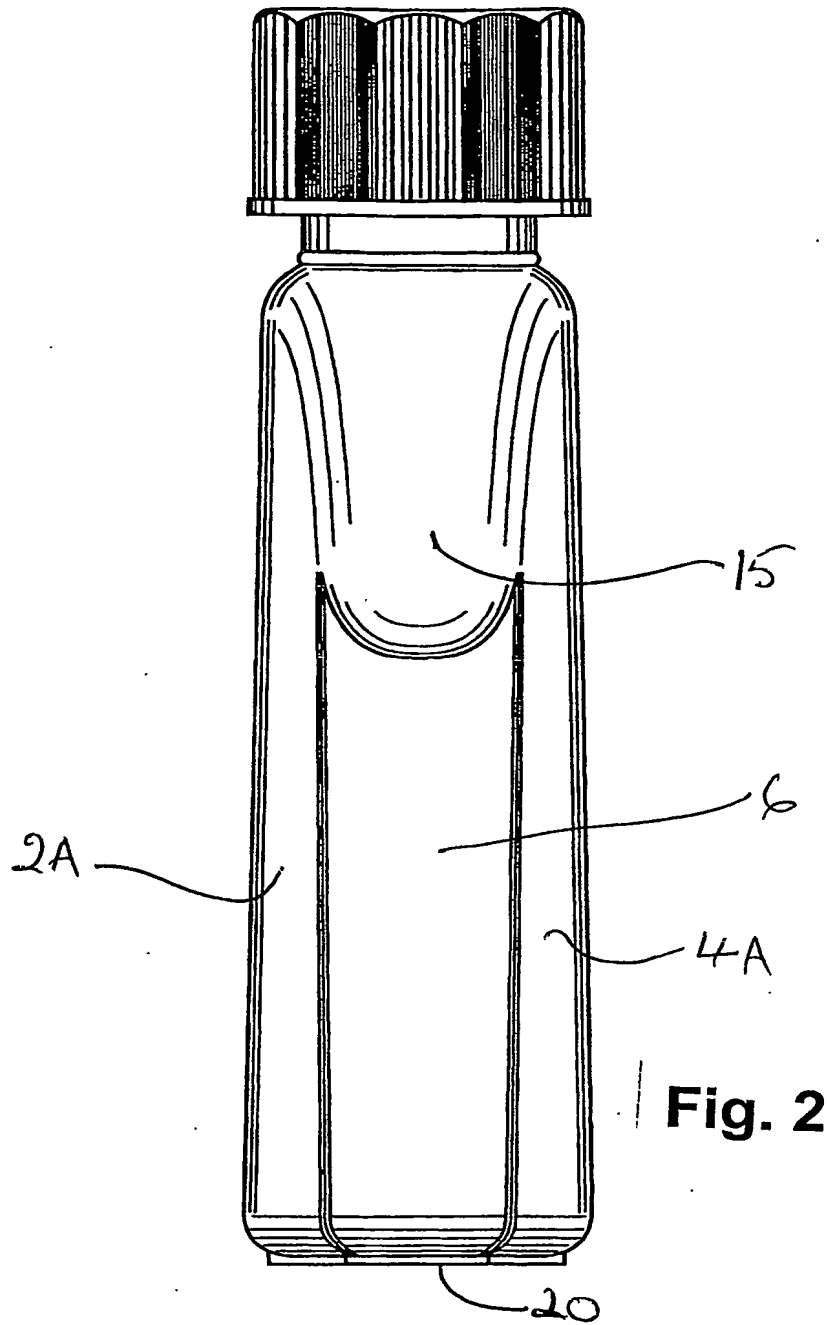


Fig. 2

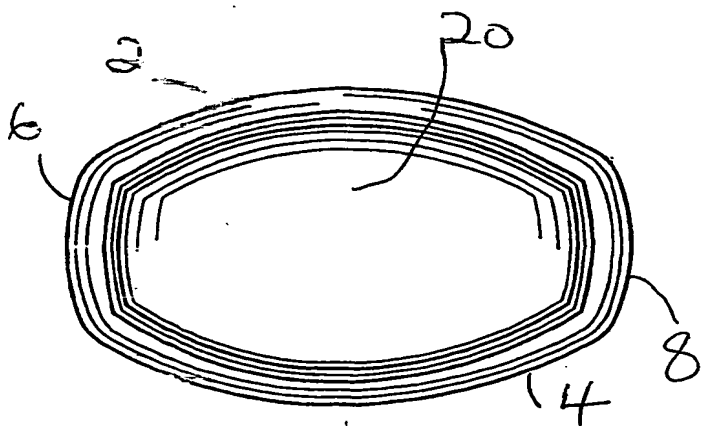


Fig. 4

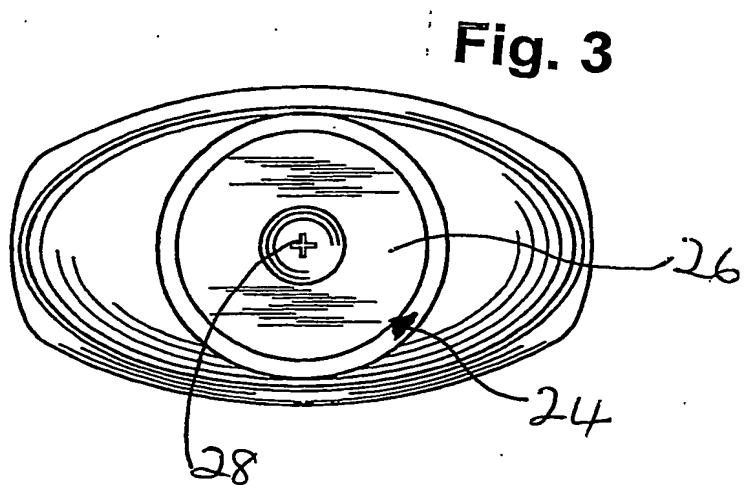


Fig. 3

PCT Application  
**GB0305314**

